TERRA
DYNAMICS INC
INJECTION WELL SERVICES - OIL & GAS CONSULTING

February 7, 2011 11-101

Mr. Brian Graves
U.S. Environmental Protection Agency
Allied Bank Tower at Fountain Place
1445 Ross Avenue
6WQ-SG
Dallas, Texas 75202-2733

Re: ExxonMobil Petition Reissuance Request

Dear Brian:

In response to the following deficiency,

3. In the first Notice of Deficiency, EPA cited scale problems for most Section 7 Plates in Volume I provided to present reissuance geology and modeling results together. ExxonMobil revised these Plates and submitted replacements in response to the deficiency with revised Plates being plotted on a 1" equals 6000' scale and the scale being correctly displayed. In reviewing the revised Plates to confirm the corrections, EPA notes that a small cumulative plotting scale error still exists on each Plate of generally between 300 and 500 feet in both the overall X and Y dimensions. ExxonMobil should review all of the Section 7 revised Plates, 7-1 through 7-23, and correct the slight cumulative scale error so that X and Y scale dimensions properly reflect the cumulative distances used on each Plate.

I reviewed the Plates and reprinted them to try to determine what the issue is. I have verified that depiction on my computer screen is correct with respect to scale, but there does appear to be a slight error introduced during reproduction. Our plotter rolls out the paper and uses an inkjet process to lay down the image ink as the plotter rolls out the paper. Without any other explanation for the small stretch, or small reduction, I am left to believe that either the mechanical process, or "shrink or expansion" which may occur as the damp ink is absorbed into the paper is the culprit. I will do my best to reproduce the subject Plates with the scale being as correct as possible.

As a possible solution, if I removed the statement in the legend which states (for example: 1" = 6,000') and replace it with a scale bar, would this be a reasonable solution. This will ensure that any shrinkage or stretch is carried over to the scale in the legend. I have prepared a draft of Plate 7-1, Plate 7-7, Plate 7-13 and Plate7-15 and have added a scale bar and removed the "Scale: 1" = 6,000'". If this solution seems reasonable, please let me know and I will edit and reprint the remaining Plates.

Should you have any questions or comments, or require additional information concerning the enclosed documents, please do not hesitate to call me at (512) 795-8183. We will address any questions or comments you may have at that time.

Sincerely,

Terry D. Moody, PG
Project Manager/Senior Geologist

TDM/tdm
Attachment

cc: Buddy Hand - ExxonMobil

RESPONSE TO
ExxonMobil
Agrifos Facility - Pasadena, Texas
WDW-397 and WDW-398 - 2009 Petition Reissuance
January 31, 2011 2nd Notice of Deficiency (Clean Up Items)

Background

ExxonMobil Corporation (ExxonMobil) received a no migration petition exemption on January 15, 2009, to operate a Class I hazardous waste well, WDW-397, to dispose of gypsum stack pond water from the Agrifos fertilizer plant facility. ExxonMobil is requesting a no migration petition reissuance to add a second newly drilled and completed Class I well, WDW-398 and increase injection volumes.

The existing exemption contains the following conditions:

- Cease injection into WDW-397 by December 31, 2020
- Defined Confining Zone: 4850' - 5347' kelly bushing depth (KB) for WDW-397
- Defined Injection Intervals: 5922' - 7272' KB for WDW-397 with an upper completion depth limit of 6200' KB
- Defined Injection Zone: 5347' - 7272' KB for WDW-397
- Specific gravity range of the waste stream: 1.00 to 1.05 g/cc inclusive at 68°F and 1 atmosphere with a reference temperature of 68 °F
- Cumulative volume injected into WDW-397 shall not exceed:
  (140 gpm)(1440 minutes/day)(number of days in that month) for the Frio D Sand
  (700 gpm)(1440 minutes/day)(number of days in that month) for the Frio E&F Sand
  (700 gpm)(1440 minutes/day)(number of days in that month) for the Frio A/B Sand
- Perform an annual flow profile survey in WDW-397 to confirm the flow distribution in the Frio D, E&F, and A/B Sands
- Approved waste codes: D002, D004, D005, D006, D007, D008, D009, D023, D024, D025, D030, and F039 (based on constituents in Table 6-3)

In the 2009 reissuance, ExxonMobil is requesting the following conditions:

- Cease injection into WDW-397 and WDW-398 by December 31, 2020
- Retain the same injection intervals as in the current petition, 5900' - 7250' below ground level (BGL) for both WDW-397 and WDW-398 with an upper completion depth limit of 6178' BGL
- Cumulative volume injected into WDW-397 and/or WDW-398 shall not exceed:
  (360 gpm)(1440 minutes/day)(number of days in that month) for the Frio D Sand
  (1200 gpm)(1440 minutes/day)(number of days in that month) for the Frio E&F Sand
  (1200 gpm)(1440 minutes/day)(number of days in that month) for the Frio A/B Sand
  (1200 gpm)(1440 minutes/day)(number of days in that month) for total volume into WDW-397 and/or WDW-398

- An annual flow profile survey to be run in both WDW-397 and WDW-398 to confirm that total flow distribution into the Frio D Sand does not exceed 360 gpm between the two wells
- Specific gravity range of the waste stream is 1.00 to 1.05 g/cc at 68°F and 14.7 psi with 68°F reference temperature
- Retain the same hazardous waste codes

Section 4 – Geology and Hydrogeology

1. In Section 4.2.6, Page 4-31, Volume I, the sentence at the start of the second paragraph includes the phrase "the from." ExxonMobil should complete or modify the phrase to clarify the sentence meaning.

   Response: The text on Page 4-31 has been revised and the phrase "the from" has been corrected. A revised Page 4-31 text page is provided with this response and is offered as a replacement for the existing text page.

Section 7 – Modeling

1. On Figure 7-1, a log cross section correlated across WDW-398, WDW-397, and WDW-147 and referenced in Section 7, Volume I, the footage indicator on log display for WDW-397 is unclear and appears to show a repeat of the interval from approximately 6260' to 6420' KB depth. The footage indicator for the log also appears distorted in general above 6260' KB. ExxonMobil should review the WDW-397 log as shown and make appropriate revisions to clarify its presentation in the figure.

   Response: Figure 7-1 was reprinted using a different printing protocol. The footage indicator errors are no longer distorted. A replacement Figure 7-1 is provided with this response.

2. In Section 7.3.3, Pages 7-21 through 7-23, Volume I, ExxonMobil references and provides summary tables of historical static bottom hole pressure data for the Frio Formation Injection Interval Frio D, E&F and A/B Sands in WDW-397, the Frio E&F Sand in WDW-147, and the Frio Formation Injection Interval Frio A/B Sand in WDW-319. The data in these tables are supported by pressure measurement data reports provided in Appendix C, Volume III. WDW-397's table appeared in error for October 2008 while WDW-319's table appeared in error for September 2000 and March 2002 when compared with Appendix C reports. WDW-147's table has multiple disagreements with Appendix C reports. ExxonMobil should review all three tables and reconcile all individual column values with their corresponding reports in Appendix C.

   Response: The subject tables of historical static BHP data provided on pages 7-21 through 7-23 have been edited and are now consistent with the corresponding data provided in Appendix C. Revised Section 7.0 text pages are provided with this response and are offered as replacement for the existing text pages.

3. In the first Notice of Deficiency, EPA cited scale problems for most Section 7 Plates in Volume I provided to present reissuance geology and modeling results together.

ExxonMobil revised these Plates and submitted replacements in response to the deficiency with revised Plates being plotted on a 1" equals 6000' scale and the scale being correctly displayed. In reviewing the revised Plates to confirm the corrections, EPA notes that a small cumulative plotting scale error still exists on each Plate of generally between 300 and 500 feet in both the overall X and Y dimensions. ExxonMobil should review all of the Section 7 revised Plates, 7-1 through 7-23, and correct the slight cumulative scale error so that X and Y scale dimensions properly reflect the cumulative distances used on each Plate.

Response: Revised Section 7.0 Plates are provided with this response. The subject scale error has been addressed. The revised plates are offered as replacement for the existing Section 7.0 plates.

Section 8 – Area of Review

1. In the first Notice of Deficiency, EPA requested more detailed maps of artificial penetrations (APs) around the Clinton Dome which encountered the 10,000 year demonstration low density buoyant plume. In response, ExxonMobil provided Plates 8-1B through 8-1D which provide coverage of APs to the west, northwest, and north of Plate 8-1A, a Clinton Dome Railroad Commission field Inset Map, as well as revised discussion in Section 8.2.3, Pages 8-10 through 8-13, Volume I, to address AP discrepancies between Plates 8-1A and 8-2, a Tobin base map centered on the Clinton Dome. ExxonMobil also includes a revised Plate 8-1, a master base map showing all APs within the path of the composite 10,000 year low and high density worst case plumes regardless of the sand horizon. ExxonMobil should address the following items concerning the various maps and AP discussion in Section 8:

   a. ExxonMobil discussed in its deficiency response that during the map revisions and expansion process it identified AP 231 as an additional AP to be documented within the low density plume path. ExxonMobil provided a plugging record for AP 231 in Appendix G, Volume IX and indicated that well was plugged with cement from total depth, 5500 feet, to surface. A review of the plugging record in Appendix G indicates that the well was not filled from total depth to surface, but instead only 88.5 cubic feet of cement were pumped, representing a total height of only 431 to 504 feet based on 6 5/8 inch casing. The plugging record also indicates an obstruction in the well at 290 feet. ExxonMobil should provide an additional record or discussion text, based on the well completion date and drilling practices of that period, documenting that the well was rotary drilled with mud.

   Response: Additional records were researched in reference to AP 231. D-B Associates believes the well to be either a mis-spotted duplicate location for DB-208 or a mis-spotted location for another well. The DB-231 well location is not present on the IHS Energy maps (commercial scout ticket information source), the TGS LogLine maps (commercial well log and scout tick information source), current Tobin oil and gas base maps, current Geomap Company geologic structure maps or historical RRC base maps. In addition, no other records are available for any well at the location. The well location IS present on a current RRC gis map.

Assuming the information provided on the Form W-3 for DB-231 is accurate and that DB-231 is located at the location mapped by the RRC, an evaluation of the status of the well is appropriate. Section 8.3.7 of the Section 8.0 has been revised to include an evaluation of DB-231 and is offered as a replacement for the existing text information. The additional AP 231 records are provided with this response and should be added to the existing records included in Appendix G.

b. Provide additional text early in Section 8.2.3 explicitly clarifying that not all the APs within the path of the composite 10,000 year plume demonstration are located and labeled, by either "DB" or a map ID number, on a single base map such as Plate 8-1 but instead must be determined from a combination of review of Plates 8-1, 8-1A through 8-1D, and 8-2. Clarify also why all DB numbers are not shown on Plate 8-1.

Response: Section 8.2.3 has been edited to clarify that not all the APs within the path of the composite 10,000 year plume demonstration are located and labeled, by either "DB" or a map ID number, on a single base map such as Plate 8-1 but instead must be determined from a combination of review of Plates 8-1, 8-1A through 8-1D, and 8-2. Information has also been added to clarify why all DB- numbers are not shown on Plate 8.1. A revised Section 8.2.3 is provided with this response and is offered as a replacement for the existing text pages.

c. Label all wells tied in on the cross section lines on Plate 8-1 that are identified by "DB" labels on cross section lines on Plates 8-1A through 8-1D and Plate 8-2.

Response: All wells tied in on the cross section lines on Plate 8-1 that are identified by the DB- designation are now labeled on Plates 8-1A through 8-1D and Plate 8-2. Revised Plates 8-1, 8-1A through 8-1D and 8-2 are provided with this response and are offered as replacement for the existing Plates.

d. Appendix H, Volume X contains sensitivity low density plume model cases for Frio E&F and A/B Sands using an average reduced net thickness, based on average net thickness values within the projected plume pathway for injection solely into WDW-397. Plates H-1 and H-2 show the extent of both sensitivity runs as compared to their counterpart runs referenced in Volume I on Plates in Sections 4 and 7. Both sensitivity case boundaries appear to extend slightly outside the limits of the buoyant cases referenced in Section 8.2.3 as being used to show the worst composite plume boundary on Plates 8-1, 8-1A through 8-1D, and Plate 8-2.

ExxonMobil should address the impact of the sensitivity runs on a worst case overall composite boundary in the updip direction towards the Clinton Dome on Section 8 Plates including consideration of sensitivity cases evaluating injection solely into WDW-398 with a reduced net thickness in the Frio A/B and E&F Sands. ExxonMobil may choose to do this by one of the following:

1) Run additional low density plume sensitivity cases for injection solely into WDW-398 in the Frio E&F and A/B Sands. Incorporate the plume boundaries

from the Appendix H sensitivity cases for WDW-397 with the additional cases for WDW-398 into the composite 10,000 year plume boundary on Section 8 Plates. ExxonMobil may elect to show these sensitivity case boundaries on the Section 8 Plates with additional notation as "sensitivity case boundary limits added to the plume composite boundary and supporting discussion in Section 8.

or

2) Assume the sensitivity cases for injection solely into WDW-398 will perform similar to the ones run previously for WDW-397 to determine the margin of the 10,000 year composite plume boundary expansion. Analytically account for the sensitivity cases impacts of injection solely into either WDW-397 or WDW-398 as either a revision of the composite plume boundary or as an additional plume boundary limit with an appropriate label referencing Appendix H sensitivity cases on Section 8 Plates.

   Any additional APs not previously reviewed as a result of the sensitivity cases plume boundary should be addressed in Section 8. Appropriate supporting text should be added to Section 8, Appendix H, and elsewhere in the reissuance document as needed to clarify the impact of the sensitivity cases on the composite plume boundary expansion and AP records review.

   Response: Additional model runs were prepared which considered future injection into "either" WDW-397 or WDW-398 at an individual maximum injection rate of 1,200 gpm. The majority of these model runs were incorporated into the Section 7.0 text discussion, and the sensitivity cases provided in Appendix H were also revised accordingly. The composite plume boundary now depicted on Plate 8-1 includes the results of the sensitivity case boundary limits. Supporting discussion has been added where appropriate in Section 7.0 and Section 8.0, as well as the associate Section 7.0 and Section 8.0 Plates. Revised Section 7.0 and Section 8.0 text pages and associated Plates are provided with this response and are offered as replacement for the existing text pages.

ExxonMobil
Agrifos Facility - Pasadena, Texas
WDW-397 and WDW-398 - 2009 Petition Reissuance
February 2, 2011 Notice of Deficiency (Clean Up Items)
Received Via Email Response

1. Email dated 2/3/11 - Modeling item 3 concerning map scale issues - I reviewed the draft maps you sent us via overnight mail. Your approach on draft maps with the scale bar revision will satisfy the response to this deficiency. You'll need to submit a complete set of revised scale maps with this approach to fully address the deficiency.

   Response: Revised Section 7.0 Plates (and Section 8.0 Plates) are provided with this response. The subject scale error has been addressed. The revised plates are offered as replacement for the existing plates.

2. Emails dated 2/1 and 2/2/11 - Specific gravity item related to implementation and compliance plan after R6 facility inspection and our phone discussion on 2/1/11 - Your draft revisions submitted by email on 2/2/11 to Section 2, General Administrative Information, and Section 3, Implementation and Compliance, appear to address the hydrometer sample temperature issues, a flexible SG condition range revision at two measurement temperatures instead one and an appropriate correction method for use of a sample temperature other than the one the hydrometer was calibrated for. I reviewed the reissuance document and agree with you that these are likely the only two reissuance sections requiring revision to account for the sample temperature item.

   I had one minor question about the hydrometer correction process for sample temperature. Your draft Section 3 essentially says a 60/60 hydrometer will be used to measure samples at temperatures other than what it is calibrated for, 75 deg F in the correction example, and then correct that reading to a compliance condition temperature, 68 deg F, still different from what the hydrometer is calibrated for.

   In reading through ASTM D 1429-95 Test Method D, hydrometers, Standard Test Methods for Specific Gravity for Water and Brine, it appears that for a 60/60 hydrometer, the correction factor is to add 0.0002 for each sample degree above the hydrometer calibration temperature to correct back to the hydrometer calibration temperature. Using this correction factor, I obtained about the same correction as your draft document showed from going back down from 75 to 68 (a difference of 8 and still higher than the calibration temperature) , 0.00014, yielding a corrected SG of 1.0314 (up from the 1.030 measured at 75) but similar

to the result you showed in the example. Do you have a technical reference for the density ratio method you used instead of the ASTM correction method? Note that the density ratio approach is acceptable for R6 Land Ban to use in the reissuance but for my own clarification I'm asking a technical reference for the density ratio.

Response: Section 2.0 and Section 3.0 text have been revised to address the hydrometer sample temperature issues, and a flexible SG condition range revision at two measurement temperatures instead one has been added and an appropriate correction method for use of a sample temperature other than the one the hydrometer was calibrated for has been added. In addition, a reference to the ASTM 1429-95 Test Method D has been added to the Section 3.0 text to suggest that the correction method to be employed by ExMob provides a similar correction factor. Revised Section 2.0 and Section 3.0 text pages are provided with this response and are offered as replacement for the existing text pages.

3. Area of Review deficiency 1.d. - This one is an issue for further phone discussion after I did additional "big picture" reissuance review and thoughts about the low density plume models along with what condition is actually requested. The injection volume condition being requested basically asks for cumulative injection volume in Frio D of 360 gpm into WDW-397 only as ExxonMobil explicitly states it will complete WDW-398 in the Frio D, despite a pressure buildup demonstration for D injection into WDW-398. As far as the Frio A/B and E&F sands, the injection volume limit requested is based on a maximum rate of 1200 gpm into **either** sand, **but** also a maximum rate in **either** WDW-397 **or** WDW-398 of **1200 gpm** for **either** Frio sand. The requested condition is detailed on Page 2-8 in Section 2 of Volume 1.

   As it stands right now, the pressure buildup models effectively bound the range of worst injection pressure increases by modeling scenarios for injection only in WDW-397, then only in WDW-398, and finally a split future injection case equally into WDW-397 and WDW-398 for each of the Frio D (360 gpm), despite WDW-398 not be allowed to inject into the Frio D), Frio E&F (1200 gpm total), and Frio A/B (1200 gpm total). The pressure buildup models appropriate address the condition requested.

   The plume cases are another matter. As discussed in Sections 7.5.1, 7.5.2, 7.5.3, future total injection is split equally into WDW-397 and WDW-398 as 180 gpm each for a total of 360 gpm in the Frio D, 600 gpm each for a total of 1200 gpm in either the Frio E&F and A/B Sands, but the requested condition asks for 360 gpm in the D into WDW-397, and 1200 gpm for either the E&F and A/B Sands into either WDW-397 or WDW-398. As it stands the 10,000 year plume models do not match up with the requested condition in Section 2. Similarly, in this reissuance, Appendix H also included sensitivity model runs except that future total injection increased to 1200 gpm and flow, instead of being only in WDW-397 as

in the original petition, is split equally between WDW-397 and WDW-398 after allowing for the historical injection into WDW-397 only, again to address thinning sands as the plume drifts towards the Clinton Dome. So both the demonstration and sensitivity plume model runs conflict with the requested condition. Also the AOR map, Plate 8-1 (and supporting AOR) have a composite worst case plume boundary based on these existing plume runs, so the requested injection volume condition is not fully supported by them either.

Options to address this would include:

1) Revise the requested condition to allow 1200 gpm total into either Frio A/B or Frio E&F, but limit the rate into either sand to each well to 600 gpm. This would match up with what is currently plume modeled for the E&F and A/B, but would limit sand injection volumes should a well be down. The Frio D plume model needs to be rerun at 360 gpm into only WDW-397 to allow for 360 gpm into it, since it is the only well allowed to be completed into Frio D.

2) Revise the plume models and corresponding plume boundaries on the AOR maps to match with the requested injection condition in Section 2.

Response: Additional model runs were prepared which considered future injection into "either" WDW-397 or WDW-398 at an individual maximum injection rate of 1,200 gpm. The majority of these model runs were incorporated into the Section 7.0 text discussion, and the sensitivity cases provided in Appendix H were also revised accordingly. The composite plume boundary now depicted on Plate 8-1 includes the results of the sensitivity case boundary limits. Supporting discussion has been added where appropriate in Section 7.0 and Section 8.0, as well as the associated Section 7.0 and Section 8.0 Plates. Revised Section 7.0 and Section 8.0 text pages and associated Plates are provided with this response and are offered as replacement for the existing text pages.

TERRA
DYNAMICS INC
INJECTION WELL SERVICES - OIL & GAS CONSULTING

June 9, 2009 09-104

Mr. Brian Graves
U.S. Environmental Protection Agency
Allied Bank Tower at Fountain Place
1445 Ross Avenue
6WQ-SG
Dallas, Texas 75202-2733

Re: ExxonMobil Petition Reissuance Request

Dear Brian:

Enclosed, please find a no-migration reissuance request for the ExxonMobil WDW-397 and WDW-398 injection wells. As you are aware, ExxonMobil is currently constructing a second injection well (WDW-398) at the Agrifos Fertilizer Plant located in Pasadena, Texas. This document is being submitted to add the operation of WDW-398 into the existing No-Migration Petition authorization which covers the operation of WDW-397. This reissuance request also modifies the injection rates previously authorized in the approved No-Migration Petition.

Should you have any questions or comments, or require additional information concerning the enclosed documents, please do not hesitate to call me at (512) 795-8183. We will address any questions or comments you may have at that time.

Sincerely,

Terry D. Moody, PG
Project Manager/Senior Geologist

TDM/tdm
Attachment

cc: Buddy Hand - ExxonMobil

Response to July 21, 2010 Notice of Deficiency

ExxonMobil
Agrifos Facility - Pasadena, Texas
WDW-397 and WDW-398 - 2009 Petition Reissuance
July 21, 2010 Notice of Deficiency

Section 1 – Executive Summary

1. In Section 1, Page 1-8, Volume I, ExxonMobil provides and references a property ownership map as an unlabeled figure showing the two ExxonMobil well easements surrounded by Agrifos property. ExxonMobil identifies Agrifos as the only adjacent property owner; however, the ownership of the land immediately adjacent to the south of the WDW-398 easement is unclear. ExxonMobil should clarify the property ownership immediately south of the WDW-398 easement.

Response: The property on which the WDW-398 injection well is located is surrounded by Agrifos Fertilizers LLC property. To the south of the Exxon Mobil property location, ExxonMobil has a limited easement to access the site location. The location map depicted on the property figure provided on Page 1-8 has an older and incorrect version of the property orientation for the WDW-398 injection well location. A revised Page 1-8 is provided with this response and shows the current orientation of the WDW-398 well location property.

Section 2 – General Administrative Information

1. In Section 2.6, Pages 2-6 and 2-7, Volume I, ExxonMobil lists proposed petition approval conditions. ExxonMobil should also include a brief narrative in this section clarifying that this is a reissuance as opposed to an initial petition and noting the proposed changes from the original petition (e.g., addition of a second well, increased injection volumes, etc.) prior to listing the proposed approval conditions.

Response: Section 2.6 has been revised and includes both the currently authorized petition conditions and the proposed petition approval conditions. The narrative included at the beginning of Section 2.6 has been expanded to clarify that the subject document is a reissuance request, rather than an initial petition request and also notes the proposed changes from the original petition. Revised text pages 2-6 to 2-11 (revision date: August 27, 2010) are included with this response and are offered as replacement text pages for the existing document text pages.

Section 4 – Geology and Hydrogeology

1. ExxonMobil should include a composite annotated log of well WDW-398 in the petition.

Response: Two copies of a composite annotated log of WDW-398 are included with this response. One copy of the log should be placed in Appendix B and the second copy should be placed in Appendix C-9.

2. ExxonMobil has included drilling and completion reports for WDW-398 in Appendices J1-J3, Volumes XI-XIII and requested addition of the well as part of this reissuance, but has not revised the site geologic maps in Volume I to incorporate geologic information obtained

3. Plate 4-1, Map Showing Local Study Area, ExxonMobil should update this map. It is confusing and the legend is incomplete as to the different symbols and colors used for the high density and low density plumes and the Frio D, A/B, and E&F sands.

Response: In order to simplify the information presented on Plate 4-1, three separate Plates were prepared and the data presented on Plate 4-1 was distributed across the three new plates. Plate 4-1A, Plate 4-1B and Plate 4-1C are each Maps Showing the Local Study Area. Plate 4-1A also depicts the location of the Frio D Sand 10,000-year waste plumes, while Plate 4-1B depicts the location of the Frio E&F Sand 10,000-year waste plumes, and Plate 4-1C depicts the location of the Frio A/B Sand 10,000-year waste plumes. The legend has been corrected for each plate and is much simpler given that the amount of data displayed has been reduced. The new plates 4-1A, Plate 4-1B and Plate 4-1C are provided with this response and are offered as replacement for the existing Plate 4-1.

4. The following comments relate to Plate 4-2 and Plate 10-2, Structural Cross Section B-B' and Plate 4-3 and Plate 10-1 Structural Cross Section A-A'.
   a. ExxonMobil included WDW-398 in Plate 10-2 (which is an updated Plate 4-2) but the top of the Anahuac is shown at a different depth between Plate 10-2, and 10-1. ExxonMobil should address this.

      Response: The top of the Anahuac depicted on Plates 4-2, 4-3, 10-1 and 10-2 has been revised (where appropriate) and is now consistent on each plate.

   b. The "remarks" shown below WDW-397, should be re-written to show the depth "6572" first and then "6634".

      Response: The "remarks" shown below WDW-397 have been re-written on the subject plates to read 6,572' to 6,634'.

   c. The "remarks interval" (6572 to 6634) should be highlighted on the WDW-397 log for all places in the petition where the remarks are shown on the log.

      Response: The "remarks interval" (6572 to 6634) has been highlighted on the WDW-397 log for all places in the petition where the remarks are shown on the log.

   d. On cross sections, if a formation top is a mapped horizon, add the Plate number for the structure map to the label.

      Response: The Plate Number corresponding to an appropriate structure map has been added to Plates 4-2, 4-3, 10-1 and 10-2.

      Revised Plates 4-2, 4-3, 10-1 and 10-2 are included with this response and are offered as replacement plates for the existing plates.

5. On Plate 4-8, Frio D Sand Structure and Plate 4-10, Frio E&F Sand Structure, ExxonMobil shows artificial penetration (AP) 15 on the south side of the B' fault. If the fault in AP 15 is

Response: A copy of the 2006 baseline differential temperature survey for WDW-397 is provided with this response and should be placed in Appendix F of the existing petition document.

3. In Section 5.5, Page 5-8, Volume I, ExxonMobil discusses that mechanical integrity testing (MIT) for WDW-398 is Appendices J1-J3. ExxonMobil should expand this discussion to reference MIT-related sections and appendices in Appendices J1-J3 where individual components of the WDW-398 MIT can be found and summarize what the results were.

   Response: Section 5.5 has been amended to summarize the 2009 mechanical integrity testing of WDW-398. References to Appendices J1-J3 have been revised accordingly. Revised Section 5 text pages are provided with this response and are offered as a replacement for the existing Section 5 material.

Appendices J1-J3 – Construction Summary for WDW-398

1. In the Appendix J1 Table of Contents, a listing of lists shows that a List of Tables is on Page iii; a List of Figures, a List of Plates, and a List of Appendices are on Page iv; a List of Attachments is on Page vi; and the Certification is Page vii. The page numbering in the Table of Contents is different from that shown for the actual locations of the list summaries as no Pages iii, iv, v or vi were found. Additionally, no list of attachments was found in the document. ExxonMobil should review the Table of Contents layout for correctness.

   Response: The Appendix J1, J2 and J3 Table of Contents have been revised to better identify the contents of each of the Appendices (and "sub" Appendices). The page numbering has been corrected and the list of attachments "listing" has been removed. In addition the Appendix J4 and J5 Table of Contents were edited as appropriate. Revised Appendix J1, J2, J3, J4 and J4 Tables of Contents pages are provided with this response and should be utilized as replacement pages for the petition document.

2. In Section 1, Page 1-1, Appendix J-1, Volume XI, ExxonMobil discusses the plugging of the initial WDW-398 borehole, WDW-398A, and references the drilling and plugging report for that borehole as being in Attachment A. Attachment A was not found. ExxonMobil should identify where in Appendices J1-J3 Attachment A can be found or provide a copy of it.

   Response: Page 1-1 of Appendix J-1 has been edited to indicate that the drilling and plugging report of the initial WDW-398 borehole, WDW-398A, is included in Appendices J-4 and J-5. A revised text page (Page 1-1 of Appendix J-1) is provided with this response and is offered as a replacement page for the existing Page 1-1 in Appendix J-1.

3. In Section 1, Pages 1-3 and 1-4, Appendix J-1, Volume XI, ExxonMobil discusses the actual injection zone, injection interval, and confining zone depths for WDW-398 based on logging results. In Section 2.6, Volume I, ExxonMobil lists the requested reissuance conditions for both WDW-397 and WDW-398. ExxonMobil should reconcile the requested injection zone and injection interval depths with the actual results obtained from logging WDW-398. ExxonMobil should also reconcile any approximate depths discussed for WDW-398 in Volume I (e.g., injection zone, injection interval, confining zone, and lowermost source of

in the well. The discussion text in Section 8.3 has been expanded to address the anomaly. Revised Section 8.0 text pages are provided with this response and are offered as replacement text pages for the existing Section 8.0 text pages.

7. In Appendix J1, Section 9.1, Pages 9-1 and 9-2, Volume XI, ExxonMobil discusses the initial falloff test for WDW-398 and references the test analysis in Appendix DD, Volume XIII, and in Figures 9-2 through 9-5. The falloff test discussion indicates that significant rate variations occurred before the well was shut in; however, the falloff test analysis in Appendix DD does not appear to show that superposition was used to account for rate variation prior to shut in. Additionally, the analysis plots show anomalous pressure behavior in the form of pressure fluctuations up and down during the falloff which made the test analysis questionable. ExxonMobil should address the following items concerning the falloff:

   a. Provide an electronic copy of the falloff test data for EPA review.

      Response: An electronic copy of the fall-off test data is provided with this response and should be added to Appendix DD of Volume XIII.

   b. Explain the anomalous pressure behavior on the falloff analysis plots.

      Response: As EPA has correctly pointed out, the fall-off test analyses plots show anomalous pressure behavior in the form of pressure fluctuations both up and down during the fall-off test. In an attempt to explain the unusual fluctuations, field notes and other data recorded during the September 2009 reservoir test were revisited. TDI staff confirmed that the flow valves were properly functioning and were tightly closed during the fall-off test, thus eliminating surface valve leakage as a source of the anomalous data. As a means of validating the gauge response, TDI staff next plotted the BHP data recorded with the Panex surface readout (SRO) pressure gauge against the BHP data recorded with the AKS Technologies memory readout (MRO) pressure gauge. After correcting the data for psia versus psig, the pre-injection BHP and late-time BHP data show close agreement. In addition, the MRO data appears more normal (or closer to what one would expect). The large anomalous pressure "spikes" occur when injection is introduced into the well and when flow rate is changed and/or stopped. Consequently, these periods (initiation of injection and cessation of injection) are periods of large and relatively fast changes in bottom-hole temperature and pressure. Given these observations, TDI staff suspect that the sensor coefficients may have been entered incorrectly for the Panex SRO, thus creating erroneous pressure compensation during the periods of large temperature and pressure change. The WDW-398 September 2009 fall-off test was reanalyzed using the BHP data recorded by the MRO. The revised reservoir test analyses also employed a reservoir thickness of 184 feet based on the spinner survey results (both the spinner survey and the injection test were performed at 210 gpm). Revised Appendix DD data is included with this response and is offered as a replacement for the existing Appendix DD data found in Appendix J-3 (Volume XIII).

      It is important to note that the injection/fall-off test performed on WDW-398 was not performed under optimum conditions. Due to test fluid volume limitations, the injection test lasted less than 5 hours and was performed at a fairly low injection rate.

discussion table on Page 9-3 states that 25% of the flow is entering the A/B Sand; however, the stationary stops and continuous up pass interpretation appear to show no flow going into the A/B Sand. ExxonMobil should provide clarification concerning the spinner survey results showing no injectate entering the A/B sand. EPA notes that future spinner surveys should include a second up pass run and a repeat set of stationary stops to confirm the log responses and interpretation. ExxonMobil should also incorporate the results of the WDW-398 spinner survey into the modeling discussion in Section 7, Volume I.

Response: The discussion concerning the spinner survey results provided of Page 9-3 of Section 9.2 of Appendix J-1 has been edited. EPA correctly notes that at the test injection rate (210 gpm); the Frio A&B Sand does not receive injected fluid. The discussion text has been appropriately edited to reflect these test results. Additional text was also added to suggest that future spinner survey profiles will be performed at much higher injection rates and that repeat passes and stationary stops will be performed as a matter of redundancy. The discussion text in Section 8.3 has been expanded to address the anomaly. Revised Section 9.2 text pages are provided with this response and are offered as replacement text pages for the existing Section 9.0 text pages. In addition, Section 7.3.2 of the Modeling Section (Section 7.0) of Volume I has been edited to incorporate information for the WDW-398 spinner survey. Revised Section 7.3.2 text pages are provided with this response and are offered as replacement text pages for the existing Section 7.3.2 text pages.

9. ExxonMobil should incorporate or reference the details of the injection and confining zones characteristics discussion in Section 10, Pages 10-1 through 10-4, Appendix J1, Volume XI for WDW-398 into the overall discussions concerning site geology and modeling parameters in Sections 4 and 7 in Volume I.

Response: The details of the injection and confining zone characteristics discussion in Section 10, Pages 10-1 through 10-4, Appendix J1, Volume XI for WDW-398 have been integrated into the overall discussions concerning site geology and modeling parameters in Sections 4 and 7 in Volume I. Revised Section 4 and Section 7 text pages are provided with this response which appropriately integrates this information.

Section 6 – Injection Fluids

1. In Section 6.1, Pages 6-5 and 6-6, Volume I, ExxonMobil discusses waste sample results and references Table 6-1 which contains historical sample information for pond water, gyp stack water, and injectate with the actual analyses provided in Appendix C. The last fluid sample listed in the table was injection fluid taken in January 2009. ExxonMobil should update the table to include the results from the most recent samples of injectate available.

Response: A revised Table 6-1 is included with this response and includes the most recent sample results (December 14, 2009). In addition, analytical results are provided for the sample collected on December 14, 2009 and should be added to the Appendix C data.

Section 7 – Modeling

1. In Section 7.2, Pages 7-3 and 7-4, Volume I, ExxonMobil discusses the depths of Frio sands D, E&F, and A/B in WDW-397 and how these depths were implemented in the demonstration modeling for each sand. Appendices J1 through J3, Volumes XI-XIII contain some similar items for WDW-398. ExxonMobil should address the following items for

Response: The thickness justification discussion provided in Section 7.3.1 was reviewed to ensure that average reservoir thickness values were appropriate for the expanded operational and 10,000-year timeframes in the petition reissuance demonstration.

Frio D Sand – the Frio D Sand is thinner than anticipated at the WDW-398 location. The text has been revised to incorporate the net sand thickness for the WDW-398 location. The Frio D Sand net thickness within the expanded operational area was recalculated both due the revised net sand thickness around the WDW-398 well location and due to the expanded operational plume size. The Frio D Sand has a net thickness of about 29 feet at the WDW-397 injection well location, about 18 feet at the WDW-398 injection well location, and has an average net thickness value of 30 feet within the end-of-operations waste plume, and has an average net thickness of 36 feet within the projected path of the 10,000-year buoyant plume. To account for the absence of the Frio D Sand, the grid cells within the approximate 10-foot thick contour interval line were made inactive via use of the R1-26 Card (FPV=0). A net sand thickness of **25 feet** was selected as a representative thickness of the Frio D Sand interval within the remainder of the modeled area. Therefore, the reservoir thickness value employed for the Frio D Sand remains valid.

Frio E&F Sand – the Frio E&F sand thickness in the WDW-398 injection well is very close to the thickness in WDW-397. The Frio E&F Sand net thickness within the expanded operational area was recalculated due to the expanded operational plume size. The Frio E&F Sand has a net thickness of about 188 feet at the WDW-397 injection well location, about 184 feet at the WDW-398 injection well location, and has an average net thickness value of 189 feet within the end-of-operations waste plume, and has an average net thickness of 133 feet within the projected path of the 10,000-year buoyant plume. The average net thickness over the project path is equivalent for this petition reissuance. In general, reservoir thickness within the expanded plume area across the Clinton Dome is slightly less, but the expanded plume size in the southeast portion of the waste plume extends into slightly thicker net sand areas. When averaged across the plume area, the net sand for the petition reissuance demonstration is essentially the same (1 foot thicker) as the original petition demonstration. For this demonstration, both the base case 10,000-year plume model (150-foot reservoir thickness), and the sensitivity analyses 10,000-year plume model (132-foot reservoir thickness) are appropriate.

Frio A/B Sand – the Frio A/B sand thickness in the WDW-398 injection well is very close to the thickness in WDW-397. The Frio A/B Sand net thickness within the expanded operational area was recalculated due to the expanded operational plume size. The Frio A/B Sand has a net thickness of about 152 feet at the WDW-397 injection well location, about 147 feet at the WDW-398 injection well location, and has an average net thickness value of about 143 feet within the end-of-operations waste plume, and has an average net thickness of about 91 feet within the projected path of the 10,000-year buoyant plume. Similar to the Frio E&F Sand, in general, reservoir thickness within the expanded plume area across the Clinton Dome is approximately equal (or slightly less), but the expanded plume size in the southeast portion of the waste plume extends into thicker net sand areas. When averaged across

5. In Section 7.3.3, Page 7-21, Volume I, ExxonMobil references Appendix C, Volume III as containing current bottom hole pressure data for WDW-397. Appendix C included 2006 and 2008 falloff tests. ExxonMobil should add the 2009 falloff test for WDW-397 to Appendix C and reference any falloff test data for WDW-398 as well.

   Response: Information concerning the 2009 fall-off test for WDW-397 is provided with this response and should be added to Appendix C-5. Section 7.3.3 text has been edited to indicate the location of the WDW-398 reservoir test data as being included in Appendices J-1 and J-3. Revised Section 7.3.3 text is provided with this response and is offered as replacement text for existing petition document text pages.

6. In Section 7.3.4, Pages 7-22 through 7-24, Volume I, ExxonMobil discusses formation temperature in WDW-397 and offset injection wells. ExxonMobil should include additional discussion about the bottom hole temperature data obtained in WDW-398.

   Response: Section 7.3.4 has been edited and incorporates bottom-hole temperature data collected in WDW-398. Revised Section 7.3.4 text is provided with this response and is offered as replacement text for existing petition document text pages.

7. In Section 7.3.5, Pages 7-24 and 7-25, Volume I, ExxonMobil discusses core porosity data from WDW-397 and offset injectors to justify porosity values used in the demonstration models. ExxonMobil should include additional discussion about porosity data obtained from WDW-398 and reference the data.

   Response: Section 7.3.5 has been edited and incorporates core porosity data collected in WDW-398. Revised Section 7.3.5 text is provided with this response and is offered as replacement text for existing petition document text pages.

8. In Section 7.3.7, Page 7-27, Volume I, ExxonMobil references Figure C-1 in Appendix C, Volume III as showing the average dip angle used in the high density plume demonstration models. ExxonMobil should correct the figure reference to Figure C-9.

   Response: Section 7.3.7 has been edited to reference the correct figure (Figure C-9). Revised Section 7.3.7 text is provided with this response and is offered as replacement text for the existing petition document text pages.

9. In Appendix C, Part 10, Volume III, ExxonMobil provides the rate data for the various injection wells considered in the demonstration modeling. WDW-397 records were provided at the end of Part 10; however, the Texas Commission on Environmental Quality (TCEQ) forms for WDW-397 listed no injection volume data. ExxonMobil should include the TCEQ forms showing WDW-397's historical injection volumes.

   Response: TCEQ forms showing WDW-397's historical injection volumes are provided with this response and should be inserted in Appendix C-10. The forms cover the period from April 2008 to July 2010. A summary table for the injection rates and volumes injected into WDW-397 has also been prepared and is included with the TCEQ data forms.

13. In Section 7.3.15, Pages 7-48 through 7-50, Volume I, ExxonMobil lists calculations for the various well indices for input to the SWIFT pressure buildup and plume models in all three Frio Sands. EPA obtained different results than shown for all of the well indices. ExxonMobil should confirm the indices calculation results for each sand and determine if any revised model inputs result, if they would impact the demonstration models, and whether or not model reruns are necessary.

Response: The subject well index values provided in Section 7.3.15 are in error and have been corrected. In each case, the corrected well index is higher than the values employed in the demonstration, and are less conservative. With all other parameters being equal, a higher well index value lessens the derived wellbore pressure and brings it closer to the grid block pressure value. A lower well index value has the opposite effect. Although the well index values reported in Section 7.3.15 are in error, they result in conservative wellbore pressure increases. It is therefore not necessary to rerun the models to account for this error. Revised Section 7.3.15 text pages are provided which correct the well index value and indicates that lower well index values were employed to be conservative.

14. In Sections 7.5.1 through 7.5.6, Pages 7-71 through 7-78, Volume I, ExxonMobil discusses the results of 10,000 year plume demonstration modeling, summarizing plume movement distances for both low and high density plumes in the Frio D, E&F, and A/B Sands. ExxonMobil should address the following items concerning the plume model results:
    a. In Section 7.5.1, ExxonMobil references Plate 7-11 for showing the low density Frio D 10,000 year plume boundaries and states that the 10,000 year plume extends 45,700' (assumed to be from WDW-397) updip towards Clinton Dome. Plate 7-11 lists a scale of 1" equals 6000'. A review of Plate 7-11 shows a different plume updip migration distance because the bar scale shown on the plate appears closer to 0.9" equals 6000'. ExxonMobil should confirm all the 10,000 year plume dimensions listed in the discussion and at the bottom of the plate as well as the map scale shown.

    Response: During the printing/publication process, "fit to page" options were selected which resulted in scaling down the printed version of the Plate. Plate 7-11 has been reprinted at the correct scale and is provided with this response. The 10,000-year plume dimensions listed in the discussion and the bottom of the plate were reviewed and are correct.

    b. In Section 7.5.2, ExxonMobil references Plate 7-14 for showing the low density Frio E&F 10,000 year plume boundaries and states that the 10,000 year plume extends 37,000' (assumed to be from WDW-397) updip towards Clinton Dome. Plate 7-14 lists a scale of 1" equals 6000'. A review of Plate 7-14 shows a different plume updip migration distance because the bar scale shown on the plate appears closer to 0.9" equals 6000'. ExxonMobil should confirm all the 10,000 year plume dimensions listed in the discussion and at the bottom of the plate as well as the map scale shown.

    Response: During the printing/publication process, "fit to page" options were selected which resulted in scaling down the printed version of the Plate. Plate 7-14 has been reprinted at the correct scale and is provided with this response. The

review of Plate 7-24 shows a different plume updip migration distance because the bar scale shown on the plate appears closer to 0.9" equals 6000'. ExxonMobil should confirm the 10,000 year plume dimensions listed in the discussion and at the bottom of the plate as well as the map scale shown.

Response: During the printing/publication process, "fit to page" options were selected which resulted in scaling down the printed version of the Plate. Plate 7-24 has been reprinted at the correct scale and is provided with this response. The 10,000-year plume dimensions listed in the discussion and the bottom of the plate were reviewed and are correct.

g. Review all other plates referenced for all Section 7 discussions about 10,000 year plume boundaries and confirm that map scales and plume dimensions shown in the plates are correct and consistent with the corresponding discussion text.

Response: Plate 7-12, Plate 7-15 and Plate 7-18 depict the modeled waste plumes on the Frio D Sand, Frio E&F Sand and Frio A/B Sand isopach maps. The isopach contours on these maps have been revised based on the information obtained during the completion of WDW-398. Revised Plates 7-12, 7-15 and 7-18 are provided with this response as replacements for the existing petition plates. The 10,000-year plume dimensions listed in the discussion and the bottom of the plates were reviewed and are correct.

Plates 7-1, 7-2, 7-3, 7-4, 7-5, 7-6, 7-7, 7-8, 7-9, 7-10, 7-13, 7-16, 7-19, 7-21 and 7-23 were reviewed and found to have the same scaling issue. Each of these Plates were reprinted at the correct scale and are included with this response as replacement text pages.

h. ExxonMobil references plume demonstration model sensitivity runs in Appendix H, Volume X. Plates H-1 and H-2 shows the 10,000 year low density plume extents for the Frio Sands E&F and A/B sensitivity cases in comparison with the plume case results for each sand in Volume I. Each plate lists a scale of 1" equals 6000'. A review of both plates shows different plume updip migration distances because the bar scale shown on both plates appears closer to 0.9" equals 6000'. ExxonMobil should confirm the 10,000 year plume dimensions listed in the sensitivity case discussions and at the bottom of the plates as well as the map scale shown on each plate.

Response: During the printing/publication process, "fit to page" options were selected which resulted in scaling down the printed version of the Plates. Plates H-1 and H-2 have been reprinted at the correct scale and are provided with this response. The 10,000-year plume dimensions listed in the discussion and the bottom of the plate were reviewed and are correct.

i. ExxonMobil should address why the plume boundaries for both the 10,000 year low and high density plumes in the Frio D Sand are extremely irregular in shape around the northeast edge on the various Section 7 plates.

migration petition demonstration. The modeling section text has been edited to reflect the completion interval depth limitations as specified for both well.

16. In Section 7.6.1.1, Page 7-82, Volume I, ExxonMobil discusses the first 60' of shale overlying the injection interval in determination of vertical movement. ExxonMobil should clarify if this is the first 60' of shale above the upper completion depth limit of 6178' GL and above the Frio D Sand, but still within the injection interval or 60' of shale above the requested injection interval top of 5900' GL.

Response: The subject text in Section 7.6.1.1 has been edited to clarify the referenced shale thickness. The subject text now reads "The distance, L, and elevation change, Δz, were both defined as the thickness of the first 60 feet of shale above the upper completion depth limit of 6,178 feet GL (in WDW-397) or 6,251 feet GL (in WDW-398) and above the Frio D Sand." A revised Section 7.6.1.1 is included with this response and is offered as a replacement for the existing petition document text.

17. In Sections 1, 2, and 7, Volume I, ExxonMobil references requested conditions and modeling demonstrations showing injection into the Frio D Sand in either WDW-397 or WDW-398. In earlier discussions with R6 concerning the reissuance, ExxonMobil indicated that it did not plan to complete WDW-398 into the Frio D Sand and, accordingly when the well was completed, the Frio D Sand was not perforated. ExxonMobil should include discussion somewhere in the reissuance clarifying whether or not the Frio D Sand will be used in WDW-398.

Response: Text has been added to Section 7.2 and Section 7.3.2 which indicates that the Frio D Sand is poorly developed at the location of WDW-398 and that the Frio D Sand was not used in WDW-398. Revised Sections 7.2 and 7.3.2 are included with this response and are offered as a replacement for the existing petition document text.

Section 8 – Area of Review

1. For APs within the area of review (AOR), if they are not deep enough, indicate with "NDE".

Response: Plate 8-1 has been revised and those artificial penetrations which are within a 2-mile radius which do not penetrate to the Anahuac Marker (marker for the Confining Zone) have been annotated with NDE (not deep enough). A revised Plate 8-1 is provided with the response and is offered as a replacement for the existing Plate 8-1.

2. ExxonMobil will need to update Plate 8-1A, Map Inset Clinton Dome, Oil and Gas Map (Railroad Commission), and Plate 8-2, Area of Review, Oil and Gas Map (Tobin Map), to include the oil and gas wells in the extended plumes to the north of Clinton Dome.

Response: In order to provide the additional area coverage for Plate 8-1A (scale of 1"=500'), three (3) new plates were prepared (Plates 8-1B, 8-1C and 8-1D). These plates cover the area of the waste plumes to the north, west and northwest of Clinton Dome. Plate 8-2 is a "Tobin Map" at a scale of 1"=500'. Plate 8-1 is a "Tobin Map" at a scale of 1"=2000'. Since Plate 8-1 covers the area of concern, it is not necessary to expand Plate 8-2 across the areas of concern. A revised Plate 8-1A and new Plates 8-1B, 8-1C and 8-1D are provided with this

Response: During the reproduction process, well records for DB-167 were inadvertently omitted. In addition, portions of the records for DB-165 thru DB-169 were also omitted. A complete set of the omitted well records are provided with this response. Please remove all records for beginning with DB-165 and ending with DB-169 and insert the well records included with this response.

6. In Section 8.2.5, Pages 8-13 through 8-18, Volume I, ExxonMobil discusses APs in the fixed 2 mile AOR and cone of influence (COI). ExxonMobil should address the following items concerning Section 8.2.5:
   a. On Page 8-15, AP 14 is identified as being plugged with cement plugs and 10.5 lb/gal mud and well records in Appendix G, Volume VIII are referenced. R6 agrees the well is properly plugged to withstand the projected pressure rise at the location; however, the only mud weight legible in the well records was 11.5 lb/gal based on the well's log header. ExxonMobil should clarify what well record indicated that 10.5 lb/gal mud was used in plugging the well.

      Response: A more legible copy of the well log for AP-14 is provided with this response. Based on the log header, 11.5 lb/gal mud was in the well when the depth of 7,300 feet was reached and 12.3 lb/gal mud was in the wellbore when the well reached the total depth of 8,328 feet. A copy (more legible) of the log header is provided with this response, along with a revised copy of the schematic drawing for AP-14. Based on this information, the information in Section 8.2.5 concerning AP-14 was revised and now cites a mud weight of 12.3 lb/gal. A revised Section 8.2.5 is included with this response and is provided as a replacement for the existing Section 8.2.5 text.

   b. On Page 8-16, AP 16's allowable pressure rise is calculated with the AP's location listed as corresponding to pressure buildup model cell 79, 14 with a grid block center depth of 6540' below mean sea level (MSL). A review of the pressure buildup model input file, EXMOB_Dprs_A.dat, in Appendix E-1, Volume V shows that cell 79,14 has a grid block center depth of 6439.5' MSL depth. ExxonMobil should confirm the correct corresponding cell grid block center depth and make appropriate revisions to the allowable pressure buildup calculation as needed.

      Response: The subject error has been corrected. The rounded up number of 6,440 feet MSL is correct and appropriate revisions were made to the allowable pressure buildup calculation for AP-16. A revised Section 8.2.5 is included with this response and is provided as a replacement for the existing Section 8.2.5 text.

7. In Section 8.2.7, Pages 8-22 through 8-42, Volume I, ExxonMobil discusses APs within the 10,000 year modeled plume boundaries. ExxonMobil should address the following items concerning APs within 10,000 year plume boundaries:
   a. The log header for DB-184 is illegible and did not clearly identify the well name on it. If available, ExxonMobil should provide a more legible copy of the log header showing the actual well name.

      Response: An attempt was made to locate a more legible copy of the DB-184 log header. Another copy of the log was acquired from TGS Log-Line. The header

Protection of Usable Quality Ground Water" by Schultz is provided with this response. The June 18, 1919 Rule 9(b) states that the mud-laden fluid used to plug the well "shall weigh at least 25 per cent more than an equal volume of water". On Page 5 of the document, Schultz basically restates Rule 9(b) and indicates that "the well should have been plugged by the mud laden method with a mud weighing 25% more than water (10.5 ppg)." The discussion in Section 8.3 was edited to specifically relay the language from Rule 9(b). A revised Section 8.3 is included with this response and is provided as a replacement for the existing Section 8.3 text.

b. A second Appendix D17 document, Oil and Gas Circular No. 16-8 for 1934 rules, included Pages 8, 9, 12, and 13 and referenced an unprovided appendix under manner of plugging details on Page 9. ExxonMobil should include Pages 10 and 11 for the document and the unlisted appendix if relevant and confirm that the cited 10 lb/gal mud weight for 1934 era plugging is demonstrated by the document. Rule 17 in the document references a mud weight of 9.5 lb/gal.

Response: During the reproduction process, the reproduction company failed to copy the backside of the double-sided document, hence the missing pages. A complete copy of the "History of The Railroad Commission's Plugging Regulation for the Protection of Usable Quality Ground Water" by Schultz is provided with this response. The May 15, 1934 Rule 10(b) refers the reader to an attached appendix included as part of the Oil and Gas Circular No. 16-B for 1934 rules. The subject appendix occurs later in the document on Page 21 (note page number added to upper right corner of page). The "Instructions to Deputy Supervisor Dated February 1, 1934" confirms the cited 10 lb/gal mud weight for 1934 era plugging.

c. Another document copy in Appendix D17, Oil and Gas Circular No. 7 for 1919 rules, started with Rule 14 and did not appear to detail manner of plugging information. Rule 17 in the document references a mud fluid density of not less than 25 percent for a well drilled into oil and gas producing strata. ExxonMobil should include a copy of the manner of plugging information or its equivalent as shown in this circular and confirm that the cited 10.5 lb/gal mud weight for 1919 era plugging is demonstrated by the document.

Response: A complete copy of the "History of The Railroad Commission's Plugging Regulation for the Protection of Usable Quality Ground Water" by Schultz is provided with this response. The June 18, 1919 Rule 9(b) states that the mud-laden fluid used to plug the well "shall weigh at least 25 per cent more than an equal volume of water". On Page 5 of the document, Schultz basically restates Rule 9(b) and indicates that "the well should have been plugged by the mud laden method with a mud weighing 25% more than water (10.5 ppg)." The discussion in Section 8.3 was edited to specifically relay the language from Rule 9(b). A revised Section 8.3 is included with this response and is provided as a replacement for the existing Section 8.3 text.

INJECTION WELL NO-MIGRATION PETITION RE-ISSUANCE FOR WDW-397 AND WDW-398

VOLUME I

Text, Tables, Figures and Plates

Prepared for

ExxonMobil

Prepared by

TERRA
DYNAMICS INC
ENVIRONMENTAL SERVICES

AUSTIN, TEXAS

Project No. 09-104
June 2009

TABLE OF CONTENTS

TABLE OF CONTENTS

List of Tables

List of Tables (cont.)

List of Figures

List of Figures (cont.)

List of Plates

List of Plates (cont.)

List of Plates (cont.)

TABLE OF CONTENTS

List of Appendices

TABLE OF CONTENTS

List of Appendices

List of Appendices

List of Appendices

List of Appendices

List of Appendices

List of Appendices

List of Appendices

TABLE OF CONTENTS

List of Appendices

TABLE OF CONTENTS

List of Appendices

TABLE OF CONTENTS

List of Appendices

TABLE OF CONTENTS

List of Appendices

Appendix No.	Title	Volume
J-1	Drilling and Completion of WDW-398	XI

Appendix J-1 Table of Contents

TERRA DYNAMICS INC

Appendix J-1 Table of Contents (continued)

List of Tables

Appendix J-1 Table of Contents (continued)

List of Figures

List of Plates

List of Appendices

List of Appendices

Appendix J-2 Table of Contents

TABLE OF CONTENTS

List of Appendices

Appendix J-3 Table of Contents

TABLE OF CONTENTS

List of Appendices

Appendix No.	Title	Volume
J-4	Drilling and Plugging of WDW-398A	XIV

Appendix J-4 Table of Contents

TERRA DYNAMICS INC

Appendix J-4 Table of Contents (continued)

List of Tables

List of Figures

List of Appendices

TABLE OF CONTENTS

List of Appendices

Appendix J-5 Table of Contents

List of Appendices